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&lt;AGENCY TYPE='S'&gt;COUNCIL ON ENVIRONMENTAL QUALITY

&lt;DEPDOC&gt;[CEQ-2022-0001]

&lt;SUBJECT&gt;Carbon Capture, Utilization, and Sequestration Guidance

**AGENCY:** Council on Environmental Quality (CEQ).**ACTION:** Notice of availability; request for comments.

**SUMMARY:** Consistent with the Utilizing Significant Emissions with Innovative Technologies (USE IT) Act, the Council on Environmental Quality (CEQ) is announcing the availability of and seeking comment on an interim guidance document, “Carbon Capture, Utilization, and Sequestration Guidance,” to assist Federal agencies with the regulation and permitting of CCUS activities in the United States.

**DATES:** CEQ must receive comments by March 17, 2022.

**ADDRESSES:** You may submit comments, identified by docket number CEQ-2022-0001, by any of the following methods:

- Federal eRulemaking Portal: <https://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: (202) 456-6546.
- Mail: Council on Environmental Quality, 730 Jackson Place NW, Washington, DC 20503.

**INSTRUCTIONS:** All submissions received must include the agency name, “Council on Environmental Quality,” and docket number, CEQ-2022-0001. All comments received will be posted without change to <https://www.regulations.gov>, including any personal information provided. Do not submit electronically any information you consider to be

private, Confidential Business Information (CBI), or other information, the disclosure of which is restricted by statute.

*DOCKET:* For access to the docket to read background documents or comments received, go to <https://www.regulations.gov>.

**FOR FURTHER INFORMATION CONTACT:** Amy B. Coyle, Deputy General Counsel, 730 Jackson Place, NW, Washington, DC 20503, (202) 395–5750 or [Amy.B.Coyle@ceq.eop.gov](mailto:Amy.B.Coyle@ceq.eop.gov).

**SUPPLEMENTARY INFORMATION:** Pursuant to the Utilizing Significant Emissions with Innovative Technologies (USE IT) Act, Pub. L. 116-260, div. S, 102, 134 Stat. 1182, 2243 (2020), the Council on Environmental Quality (CEQ) is issuing this guidance for Federal agencies on the facilitation of reviews associated with the deployment of carbon capture, utilization, and sequestration (CCUS) projects and carbon dioxide pipelines, and to support the efficient, orderly, and responsible deployment of CCUS projects and carbon dioxide pipelines, where appropriate. This guidance is consistent with CEQ’s report, “Council on Environmental Quality Report to Congress on Carbon Capture, Utilization, and Sequestration” (CEQ CCUS Report or Report) issued in June 2021.<sup>1</sup>

## **Context**

The CEQ CCUS Report<sup>2</sup> recognized that to reach the President’s ambitious climate goal of net-zero emissions economy-wide by 2050, the United States will likely have to capture, transport, and permanently sequester significant quantities of carbon dioxide. There is growing scientific consensus that, while the first priority for addressing climate change must be to avoid emissions, CCUS technologies and permanent

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<sup>1</sup> CEQ CCUS Report (June 2021), <https://www.whitehouse.gov/wp-content/uploads/2021/06/CEQ-CCUS-Permitting-Report.pdf>.

<sup>2</sup>See, e.g., CEQ CCUS Report, “Executive Summary” (June 2021), <https://www.whitehouse.gov/wp-content/uploads/2021/06/CEQ-CCUS-Permitting-Report.pdf>.

sequestration are likely needed to prevent the worst impacts of climate change. CCUS deployment can and should reduce emissions of other kinds of pollution in addition to carbon pollution, protect communities from increases in cumulative pollution, and maintain and create good, union-friendly jobs across the country.

CCUS refers to a set of technologies that remove carbon dioxide from the emissions of point sources or the atmosphere, and either transport it, compress it, and inject it deep in the earth's crust (and monitor sites to verify safe and secure storage operations), or transform it for use in industrial processes or as feedstock for useful commercial products. Technical and economic feasibility of carbon capture at significant rates has been established in the literature.<sup>3</sup>

In many cases, the carbon dioxide must be transported, usually by pipeline, for permanent and verifiable sequestration. There are important differences between point-source carbon capture and carbon dioxide removal from the ambient air (CDR). However, per Congressional direction, and, for the purposes of this guidance, CCUS includes approaches such as direct air capture (DAC), which captures carbon dioxide from the ambient air, and bioenergy with carbon capture and sequestration (BECCS) techniques, where transportation and permanent and verifiable sequestration is required to meet climate goals. The Administration recognizes the imperative for CCUS actions to be considered in a timely manner and in the context of a strong regulatory regime that includes early consultation with Tribal Nations and meaningful engagement with communities, stakeholders, and other sovereigns.

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<sup>3</sup> See, e.g., Alexander Zoelle, et al., "Bituminous Coal and Natural Gas to Electricity: >90% Capture Cases Technical Note," DOE/NETL-2022/3222 (Dec. 2021); [https://www.netl.doe.gov/projects/files/BituminousCoalandNaturalGastoElectricity\\_Technical\\_Note\\_Final\\_123021.pdf](https://www.netl.doe.gov/projects/files/BituminousCoalandNaturalGastoElectricity_Technical_Note_Final_123021.pdf); Y. Du, et al., "Zero- and negative-emissions fossil-fired power plants using CO<sub>2</sub> capture by conventional aqueous amines+," *Int'l Journal of Greenhouse Gas Control* (Oct. 2021), <https://doi.org/10.1016/j.ijggc.2021.103473>; Patrick Brandl, et al., "Beyond 90% capture: Possible, but at what cost?," *Int'l Journal of Greenhouse Gas Control* (Feb. 2021), <https://doi.org/10.1016/j.ijggc.2020.103239>.

To advance these aims, the President is committed to increasing support for CCUS research, development, demonstration, and deployment (RDD&D), enhancing the Section 45Q tax incentive for CCUS (Internal Revenue Code of 1986, as amended (“Section 45Q”)), appropriately implementing the robust and effective regulatory regime that exists in the United States, and ensuring that CCUS technologies are informed by community perspectives and are consistent with the Administration’s climate, public health, and economic goals.

To reach the President’s ambitious domestic climate goal of net-zero emissions economy-wide by 2050, the United States will likely have to capture, transport, and permanently sequester significant quantities of carbon dioxide. As explained in more detail below, deploying CCUS technologies will require agencies to manage and complete sound, effective, and efficient environmental analyses under a variety of statutes, while also ensuring that CCUS systems deliver desired societal outcomes with broad and deep public support. These outcomes should generate societal net benefits, including emissions reductions. In short, the successful widespread deployment of responsible CCUS will require strong and effective permitting, efficient regulatory regimes, meaningful public engagement early in the review and deployment process, and measures to safeguard public health and the environment. Agencies have already taken actions in the past decade to develop a robust CCUS regulatory framework to protect the environment and public health across multiple statutes. This framework requires monitoring and compliance with a variety of reporting requirements. This guidance is intended to address opportunities for clarifications and improvements to ensure that CCUS is responsibly scaled in a timely manner, while maintaining the integrity of public health, the environment, and the economy.

## Guidance

CEQ issues the following guidance to facilitate reviews associated with the deployment of CCUS and to promote the efficient, orderly, and responsible development and permitting of CCUS projects at an increased scale in line with the Administration's climate, economic, and public health goals.

### **1. Facilitating Federal decision making on CCUS projects and carbon dioxide pipelines**

The process for permitting a CCUS project is similar to that for any industrial activity, and the CEQ CCUS Report<sup>4</sup> recognized that the Federal Government has an existing regulatory framework that is capable of safeguarding the environment, public health, and public safety as CCUS projects move forward. The Report also provided an inventory of Federal permits and reviews that are potentially relevant to any CCUS project.

Likewise, the Report identified a number of areas where CEQ could work with agencies to continue to facilitate efficient, orderly, and responsible deployment of CCUS. For example, federally funded CCUS projects or CCUS activities on federally managed lands may trigger obligations under a variety of statutes including the National Environmental Policy Act (NEPA); the National Historic Preservation Act; the Clean Water Act; the Clean Air Act; the Safe Drinking Water Act; the Marine Protection, Research, and Sanctuaries Act; the Outer Continental Shelf Lands Act; the Endangered Species Act (ESA); the Marine Mammal Protection Act, the Migratory Bird Treaty Act; the Bald and Golden Eagle Protection Act; the Natural Gas Pipeline Safety Act; the Rivers and Harbors Act of 1899; the Federal Land Policy and Management Act; and the Hazardous Liquid Pipeline Safety Act. Other safety, environmental, and ecological requirements may also apply.

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<sup>4</sup> See, e.g., CEQ CCUS Report, "Key Findings," "Section 5.1," and "Appendix A" (June 2021), <https://www.whitehouse.gov/wp-content/uploads/2021/06/CEQ-CCUS-Permitting-Report.pdf>.

To facilitate the deployment of CCUS in the United States, in line with the Administration's climate and economic goals, agencies should consider developing programmatic environmental reviews,<sup>5</sup> such as tiered documents or programmatic environmental impact statements (PEISs) under NEPA, or programmatic biological opinions under the ESA, where such analyses can facilitate more efficient and effective environmental reviews of multiple projects while maintaining strong community engagement.<sup>6</sup>

For example, a PEIS could be prepared for a region where agencies anticipate review of multiple CCUS projects. In 2012, the Department of Energy (DOE) and Bureau of Land Management (BLM) completed a PEIS that evaluated actions that would facilitate utility-scale solar energy development on public lands in six southwestern states.<sup>7</sup> That same year, BLM also worked with the U.S. Fish and Wildlife Service to complete a programmatic consultation under the ESA addressing the solar energy program's potential effects on listed species.<sup>8</sup> Agencies could apply a similar approach in the CCUS context, preparing programmatic analyses assessing impacts associated with the deployment of CCUS, such as to help identify appropriate areas for CCUS project deployment.

As always, agencies conducting NEPA analyses regarding proposed CCUS actions must analyze all reasonably foreseeable direct, indirect, and cumulative effects, including cumulative pollution from numerous sources. Agencies should work with communities and Tribes during the scoping phase to identify alternatives to the proposed

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<sup>5</sup> See, e.g., Effective Use of Programmatic NEPA Reviews (Dec. 18, 2014), [https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Effective\\_Use\\_of\\_Programmatic\\_NEPA\\_Reviews\\_Final\\_Dec2014\\_searchable.pdf](https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Effective_Use_of_Programmatic_NEPA_Reviews_Final_Dec2014_searchable.pdf).

<sup>6</sup> See, e.g., 40 CFR 1501.11; 43 CFR 46.140.

<sup>7</sup> See DOE and BLM, "Solar Energy Development Programmatic Environmental Impact Statement" (July 2012), <https://solareis.anl.gov/documents/fpeis/index.cfm>.

<sup>8</sup> See Bureau of Land Management Solar Energy Program, "Endangered Species Act Section 7 Compliance" (August 2013), <https://blmsolar.anl.gov/program/laws/esa/>.

action, including alternatives that reduce environmental impacts, especially on overburdened and underserved communities.

The USE IT Act established CCUS as a sector under Title 41 of the Fixing America's Surface Transportation (FAST-41) Act. However, the Federal Permitting Infrastructure Permitting Council has not received any CCUS project applications for FAST-41 coverage as of the issuance of this guidance; therefore, agencies have not had the opportunity to develop a comprehensive permitting timetable for any CCUS project. CEQ recommends that the Permitting Council Executive Director, in consultation with the Permitting Council member agencies, establish an appropriate facilitating agency for each general CCUS project category. CEQ also recommends that the Permitting Council Executive Director, in consultation with the Permitting Council member agencies, develop for each category of CCUS project recommended performance schedules. Identification of the environmental reviews and authorizations most commonly required will help facilitate timely reviews of such projects. Separately, agencies may also consider implementing memoranda of understanding to establish the process by which they will collaborate on anticipated CCUS projects and related activities.

Carbon dioxide pipelines and permanent sequestration are critical to the future nationwide deployment of CCUS. Extensive analysis identifies the priority pathways and necessary pipeline infrastructure required to achieve CCUS and permanent sequestration at a climate-relevant scale across all industries, but significant investments, planning, and community engagement and analysis are required. An expanded carbon dioxide pipeline and sequestration network in the United States should be accompanied by close monitoring and enforcement of existing regulations and development of new tools to monitor and improve safety while also reducing the number of incidents that result in leakage of carbon dioxide.

To facilitate effective permanent sequestration, the Infrastructure Investment and Jobs Act (the IIJA) provides additional funding for implementation of the Environmental Protection Agency (EPA) Class VI Underground Injection Control (UIC) Program, including funds that could enable increased staff capacity and training at agencies with geological sequestration permitting authorities, and providing grants for States with UIC Class VI primary enforcement authority (primacy) or to States seeking primacy. The IIJA also expands the Carbon Storage Validation and Testing Demonstration Program at DOE to include a large-scale carbon storage commercialization program to demonstrate the feasibility, site characterization, permitting and construction stages of permanent, commercial-scale geologic sequestration projects. In addition, the IIJA amended the Outer Continental Shelf Lands Act to authorize the Secretary of the Interior to grant leases, easements, and rights-of-way to support CCUS activities on the outer continental shelf (OCS). It also required the Department of the Interior (DOI) to promulgate related regulations within a year. CEQ will collaborate with agencies and monitor progress related to these activities and regulations in the coming months, including authorizing use of geologic pore space on Federal lands.

To build public confidence and increase transparency in geologic carbon sequestration activities, CEQ further recommends that agencies responsible for greenhouse gas inventories and related reporting, such as EPA, include provisions that increase transparency regarding CCUS activities in the United States. For example, the EPA could consider enhancing reporting for CCUS and carbon capture and utilization (CCU) in proposed rule revisions to the Greenhouse Gas Reporting Program.

Transparently and reliably quantifying the amount of carbon dioxide permanently sequestered also requires monitoring and verification, which is required as part of the EPA's UIC Class VI permitting and Greenhouse Gas Reporting Program requirements for geologic sequestration of carbon dioxide. For additional transparency regarding



geologic sequestration activities in the United States, agencies such as DOI, DOE, and the National Oceanic and Atmospheric Administration (NOAA) should consider expanding existing efforts, and (when feasible) implementing a national program for monitoring deep geologic carbon sequestration.

On pipelines, the IIJA establishes the Carbon Dioxide Transportation Infrastructure Finance and Innovation Program to provide flexible Federal loans and grants for building carbon dioxide pipelines designed with excess capacity. Because multiple Federal and State agencies will be responsible for planning and permitting priority pipeline pathways, and in order to ensure that these actions are aligned with climate, economic, and public health objectives, CEQ will convene the relevant agencies to assess opportunities for improvement in carbon dioxide pipeline permitting.

CEQ also recommends that the agencies with oversight authority for carbon dioxide pipelines update regulations, as appropriate, to address the deployment of CCUS technologies. For example, the impacts of climate change should be planned for and addressed in the design, construction, and maintenance of carbon dioxide pipelines. Agencies with regulatory authority, such as the Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration, should consider updating criteria for geohazard risk evaluation and emergency planning and enforce the application of those criteria to carbon dioxide and other pipeline operations in the United States. In addition, agencies should provide updated training for first responders regarding potential carbon dioxide pipeline incidents. Agencies should also consider developing and applying protocols for safety monitoring and enforcement that also consider the company's capacity to respond to an incident should one occur, evaluating financial risk.

## **2. Public Engagement and Interdisciplinary Research**

The scale of implementation of CCUS likely to be required to achieve climate goals understandably raises concerns about public health and environmental impacts, as

well as questions about who stands to benefit from the deployment of these systems.

Responsible CCUS projects should engage communities and Tribes in co-development of projects and approaches; protect communities from pollution; and incorporate environmental justice and equity considerations, especially in communities that are already exposed to multiple pollution sources.

CEQ recommends that agencies undertake measures to facilitate a transparent process and meaningful public engagement. In addition to developing robust Tribal consultation and stakeholder engagement plans and conducting regular engagement, agencies should prioritize the development and application of environmental justice best practices for CCUS efforts.<sup>9</sup> Actions that should be taken include:

- Evaluating the impacts of proposed CCUS actions on potential host communities early in the planning process;
- Providing information about the impacts, costs and benefits of CCUS in advance of Tribal consultation and stakeholder engagement;
- Consulting Tribal Nations on potential CCUS projects in a manner that strengthens Nation-to-Nation relationships;
- Avoiding the imposition of additional burdens on overburdened and underserved communities, including by evaluating direct, indirect, and cumulative effects and identifying and implementing appropriate mitigation and avoidance measures; and
- Ensuring transparent decisions and accountability to Tribes and communities with respect to any applicable mitigation measures designed to reduce environmental impacts.

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<sup>9</sup> See, e.g., E.O. 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Feb. 11, 1994); Environmental Justice: Guidance Under the National Environmental Policy Act (Dec. 10, 1997), [https://www.epa.gov/sites/default/files/2015-02/documents/ej\\_guidance\\_nepa\\_ceq1297.pdf](https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf); Promising Practices for EJ Methodologies in NEPA Reviews (Mar. 2016), [https://www.epa.gov/sites/default/files/2016-08/documents/nepa\\_promising\\_practices\\_document\\_2016.pdf](https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf).

When feasible, CEQ further recommends that agencies with substantial CCUS technology development and deployment activities initiate interdisciplinary RDD&D programs and robust community engagement in the context of CCUS technology deployment. This can help to ensure that RDD&D on CCUS is informed by diverse academic perspectives and aligned with community objectives and goals. These agencies include DOE, EPA, DOT, and the National Science Foundation. The White House Office of Science and Technology Policy should coordinate this interdisciplinary research.

### **3. Understanding Environmental Impacts**

The CEQ CCUS Report also highlighted the need to further assess and quantify potential impacts on local criteria air pollutants and other emissions resulting from carbon capture retrofits at industrial facilities in response to concerns regarding potential cumulative emissions from single and/or multiple sources.<sup>10</sup> In addition to assessing criteria pollutants associated with CCUS activities, agencies should also assess carbon dioxide emissions from project infrastructure. OCS sequestration projects should further consider possible impacts on water column carbonate chemistry.

CEQ recommends that agencies, including EPA and DOE, collaborate on studies regarding the effect of carbon capture deployment on air quality in the United States. Such studies will be coordinated by CEQ, and may include evaluating use of air dispersion modeling as part of comprehensive air quality impacts analysis and will be used to develop additional guidance for considering air quality impacts as part of the planning and permitting process for CCUS activities. CEQ also recommends that agencies, including DOE, EPA, DOI, and NOAA, collaborate on additional studies that are needed to better monitor and verify CCUS results and understand the impacts to

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<sup>10</sup> See, e.g., CEQ CCUS Report at 40 (June 2021), <https://www.whitehouse.gov/wp-content/uploads/2021/06/CEQ-CCUS-Permitting-Report.pdf>.

living marine resources associated with geologic sequestration and monitoring efforts on the OCS.

In addition, CEQ recommends that agencies share best practices with respect to data collection and reporting on CCUS projects. For example, DOE now requires recipients of funding to collect and report data regarding the non-carbon dioxide air emissions associated with carbon capture projects.

#### **4. Carbon Capture and Utilization and Carbon Dioxide Removal**

Each technical approach for CCU and CDR differs in technical maturity, market potential, cost, and carbon dioxide reduction potential. Each may also have different societal and environmental impacts and benefits. Enabling commercialization of CCU and CDR will ultimately require increased transparency to build public confidence in the emissions reductions associated with these projects and their durability. Such transparency can be accomplished through publicly available analyses, such as life-cycle analyses, and/or the establishment of standards or certification for products. Commercialization of CCU and CDR can be further expedited through Federal procurement and other economic incentives. The IIJA supports engineered carbon removal, including by creating regional DAC hubs.

Agencies with activities and responsibilities for CCU and CDR regulations, standards, and greenhouse gas reporting, such as EPA, DOE, the National Institute of Standards and Technology, and other relevant agencies, should consider consolidating and publishing a repository for life-cycle analysis (LCA) methodology, results, and information related to CCU and CDR, building on existing collaboration through the Federal LCA Commons. As DOE further develops standards and certifications needed to facilitate the commercialization of CCU technologies as required in the IIJA, CEQ recommends that DOE and other agencies with equities in CCUS standards consider

evaluating how standards and certifications can increase Federal procurement of CCU, CCUS, and CDR technologies.

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